

CLAIMS

1. A rotary displacement machine (10) with radial pistons (19); rotary displacement machine (10), comprising:
 - a supporting structure (11, 12);
 - a centrally mounted distributor (15);
 - a rotating unit (16) consisting of a rotor (17) provided with a number of radially extending cylindrical chambers (18), wherein each chamber (18) contains a respective piston (19) mounted for sliding movement in a first direction along a first axis (a) coaxial with the longitudinal centerline of the respective cylindrical chamber (18); and
 - means (30, 31) of bucking the radial thrust from the pistons (19), said means (30, 31) forming a bearing (29) in combination with a thrust ring (28);the rotary displacement machine (10) being characterized in that:
 - said bearing (29) comprises a rotating inner ring (28), a stationary outer ring (30), and intervening rolling means (31), said rotating inner ring (28) including engagement means (43, 45) for each piston (19), said engagement means (43, 45) allowing movement in a straight line along a first direction defined by a second axis (b) perpendicular to said first axis (a).
2. A rotary displacement machine (10) as claimed in Claim 1, wherein said engagement means (43, 45) are sliding engagement means.
3. A rotary displacement machine (10) as claimed in Claim 2, wherein said engagement means (43, 45) comprise a slide rail (43) attached to said ring (28), and a

slide (45) attached to the head of said piston (19), said slide (45) being a flat slide (45), so that the relative paths of movement of said slide (45) and said slide rail (43) are straight paths of movement along said axis (b).

4. A rotary displacement machine (10) as claimed in any of the preceding claims, wherein the force of the piston (19) is transferred to the thrust ring (28) through a hydraulically balanced end surface.

5. A rotary displacement machine (10) as claimed in any of the preceding claims, wherein at least one of said pistons (19) is provided with a closed seal ring.

6. A rotary displacement machine (10) as claimed in any of the preceding claims, wherein at least one of said pistons (19) is facing said distributor (15) with a face shaped to fill unwanted clearance.

7. A rotary displacement machine (10) as claimed in any of the preceding claims, wherein at least one piston (19) is formed with at least one lightening hole (46).

8. A rotary displacement machine (10) as claimed in Claim 7, wherein the longitudinal axis of said hole (46) extends transverse to the axis (a) of the piston (19) and does not cross a hydraulic balancing hole (47) formed in the piston (19).

9. A rotary displacement machine (10) as claimed in any of Claims 3-8, wherein

one of said pistons (19) locates fully inside the respective radial cylindrical chamber (18), and at least a portion of said slide rail (43) locates inside said radial cylindrical chamber (18).

10. A rotary displacement machine (10) as claimed in Claim 1, wherein at least one of said bearings (29, C1-C4) is an integral bearing.

11. A rotary displacement machine (10) as claimed in Claims 3 and 10, wherein the ring (28) has advantageously a sinusoidal shape, such that it can accommodate two sets of rolling bodies (31) in two side races, they being placed on one side of said slide rail (43).

12. A rotary displacement machine (10) as claimed in Claim 10, wherein at least one of said bearings (29, C1-C4) mounts an unsplit disk cage (GAB).

13. A rotary displacement machine (10) as claimed in Claim 12, wherein each unsplit disk cage (GAB) is mounted peripherally of the respective set of rolling bodies (31).

14. A rotary displacement machine (10) as claimed in Claim 10, wherein at least one of said bearings (29, C1-C4) mounts a plurality of rolling bodies in interference fit relationship.

15. A rotary displacement machine (10) as claimed in Claim 1, wherein said rotor

(17) and thrust ring (28) are controlled to rotate synchronously by a synchronization device (50).

16. A rotary displacement machine (10) as claimed in Claim 15, wherein said synchronization device (50) is a cross coupling (50).

17. A rotary displacement machine (10) as claimed in Claim 1, wherein said distributor (15) is mounted floating in the portion carrying the cover (12).

18. A rotary displacement machine (10) as claimed in Claim 17, wherein the placement of said distributor (15) can be adjusted both angularly and axially along a longitudinal centerline (A).

19. A rotary displacement machine (10) as claimed in any of Claims 17 and 18, wherein at least a surface portion of a recess (CAV) provided on the rotor (17) has a conical shape allowing said surface portions to fit together in different ways.

20. A rotary displacement machine (10) as claimed in Claim 17, wherein seal rings (AN) of metal are arranged to stop oil from leaking through the clearance gap between the outer surface of the distributor (15) and the surface of said hole (F) in said cover (12).

21. A rotary displacement machine (10) as claimed in Claim 20, wherein said rings (AN) are received each in a respective annular seat formed in the surface of said hole

(F).

22. A rotary displacement machine (10) as claimed in Claim 1, wherein said cover (12) carries an intake device (26) and a discharge device (27), said intake and discharge devices (26, 27) being each formed with a respective offset groove (26a, 27a) from a centerline (A) of the distributor (15).

23. A rotary displacement machine (10) with radial pistons (19); rotary displacement machine (10), comprising:

- a supporting structure (11, 12);
- a centrally mounted distributor (15);
- a rotating unit (16) consisting of a rotor (17) provided with a number of radially extending cylindrical chambers (18), wherein each chamber (18) contains a respective piston (19) mounted for sliding movement in a first direction along a first axis (a) coaxial with the longitudinal centerline of the respective cylindrical chamber (18); and
- means (30, 31) of bucking the radial thrust from the pistons (19), said means forming a bearing (29) in combination with a thrust ring (28);
- the rotary displacement machine (10) being characterized in that: said distributor (15) is mounted floating in the cover -carrying portion (12).

24. A rotary displacement machine (10) as claimed in any one of Claims 1 to 22, wherein at least one of the bearings (29, C1 or C4) for the rotor (17) and/or for coupling the inner and outer rings (28, 30) together provides frictional drag in which sliding means are provided which comprise at least one layer of an anti-friction plastics

material bonded, through an additional layer of a porous metal, to one of the contacting parts or another intervening metal element.

25. A rotary displacement machine (10) as claimed in any of the preceding claims, wherein said rotor (17) has a nitrided surface in the area of coupling to said distributor (15).

26. A hydraulically operated speed variator, characterized in that it incorporates at least one machine (10) as claimed in any of the preceding claims.